

CLAIMS

1. A method for producing a probe carrier comprising:
  - 5 (1) a step of preparing a purified probe;
  - (2) a step of obtaining probe information on the purified probe;
  - (3) a step of judging "good" or "not good" quality of each purified probe according to the  
10 obtained probe information and a predetermined criterion;
  - (4) a step of obtaining a probe of which quality is "good" in case of the purified probe of which quality is judged as "not good";
  - 15 (5) a step of individually dissolving each purified probe judged as "good" in a solvent for ejection to a carrier, based on at least a part of the probe information obtained in (2), at a predetermined concentration and storing each obtained probe  
20 solution in an individual storing container;
  - (6) a step of transferring each probe solution stored in said storing container to another container equipped in an apparatus for deposition onto the carrier;
  - 25 (7) a step of applying a surface treatment to the carrier for fixing the probe;
  - (8) a step of depositing said probe solution onto a

treated surface of said carrier by a method including following steps, thereby forming a plurality of mutually independent probe fixation areas;

(8-1) a step of executing an analytical inspection on  
5 the carrier subjected to said surface treatment and judging "good" or "not good" state of said carrier according to the result of said analytical inspection and a predetermined criterion;

(8-2) a step of depositing at least one selected from  
10 said plural probe solutions onto the carrier judged as "good" so as to form a probe deposition area independent for each probe solution;

(8-3) a step of executing an inspection, concerning a formed state of the probe deposition area, on the  
15 carrier on which said probe deposition area is formed, and judging "good" or "not good" state of said deposition according the result of said inspection and a predetermined criterion;

(8-4) a step of executing, on the carrier having the  
20 probe deposition area judged as "good", a fixation of the probe to the surface of the carrier thereby obtaining a probe carrier;

(8-5) a step of executing an analytical inspection on the probe in at least one of the plural probe  
25 fixation areas constituted of probes fixed on said carrier; and

(8-6) a step of judging "good" or "not good" state of

the produced probe carrier according to the result of said analytical inspection and a predetermined criterion.

5           2. A method for producing a probe carrier comprising:

          (a) a step of designing plural kinds of probes for detecting a target substance;

          (b) a step of synthesizing the designed plural  
10 probes;

          (c) a step of individually purifying the synthesized plural probes;

          (d) a step of obtaining probe information on each purified probe;

15           (e) a step of judging "good" or "not good" state of synthesis and purification in each purified probe according to the obtained probe information and a predetermined criterion;

          (f) a step of repeating the foregoing steps (b) to  
20 (e) on the purified probe of which state of synthesis and purification is judged as "not good", thereby obtaining "good" state of synthesis and purification in all the purified probes;

          (g) a step of individually dissolving each purified  
25 probe judged as "good" in a solvent for ejection to a carrier, based on at least a part of the probe information obtained in (d), in a predetermined

concentration and storing each obtained probe solution in an individual storing container;

(h) a step of transferring each probe solution stored in the storing container to another container  
5 equipped in an apparatus for deposition onto the carrier;

(i) a step of applying a surface treatment for fixing the probe to the carrier;

(j) a step of depositing the probe solution onto a  
10 treated surface of the carrier by a method including following steps, thereby forming a plurality of mutually independent probe fixation areas;

(j-1) a step of executing an analytical inspection on the carrier for judging "good" or "not good" state of  
15 the carrier according to the result of the analytical inspection and a predetermined criterion;

(j-2) a step of depositing at least one selected from plural probe solutions onto the carrier judged as "good" so as to form a probe deposition area  
20 independent for each probe solution;

(j-3) a step of executing an inspection, concerning a formed state of the probe deposition area, on the carrier on which the probe deposition area is formed, and judging "good" or "not good" state of the  
25 deposition according the result of the inspection and a predetermined criterion;

(j-4) a step of executing, on the carrier having the

probe deposition area judged as "good", a fixation of the probe to the surface of the carrier thereby obtaining a probe carrier;

(j-5) a step of executing an analytical inspection on  
5 the probe in at least one of the plural probe fixation areas constituted of probes fixed on the carrier; and

(j-6) a step of judging "good" or "not good" state of the produced probe carrier according to the result of  
10 the analytical inspection and a predetermined criterion.

3. A producing method according to claim 1, wherein the probe is a nucleic acid.

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4. A producing method according to claim 1, wherein the probe information is a weight of said probe.

20 5. A producing method according to claim 1, wherein the probe information is a purity of said probe.

25 6. A producing method according to claim 1, wherein the probe information is base sequence information of a nucleic acid.

7. A producing method according to claim 1, wherein a fixation of the probe to the carrier is executed by a covalent bonding.

5        8. A producing method according to claim 1, wherein means for spotting the probe is an apparatus equipped with single or plural ink jet nozzles.

9. A producing system to be employed in a  
10 method for producing a probe carrier according to any one of claims 1 to 8, comprising:

an analysis apparatus for obtaining the probe information of each purified probe;

an inspection apparatus for judging "good" or  
15 "not good" state of synthesis and purification of each purified probe;

an apparatus for depositing, to the carrier, each probe solution supplied from a storing container individually storing each purified probe solution  
20 judged as "good";

an analysis apparatus for the carrier subjected to said surface treatment;

an inspection apparatus for judging "good" or "not good" state, concerning a formed state of the  
25 probe deposition area, on the carrier on which the probe deposition area is formed;

an apparatus for executing, on the carrier

having the probe deposition area judged as "good", a fixation of the probe to the surface of the carrier thereby obtaining a probe carrier; and

an apparatus for executing an analytical  
5 inspection on the probe in at least one of the plural probe fixation areas constituted of probes fixed on the carrier.

10 10. A producing system to be employed in a method for producing a probe carrier according to any one of claims 1 to 8, comprising:

a synthesis apparatus for synthesizing plural designed probes;

15 a purification apparatus for individually purifying the synthesized plural probes;

an analysis apparatus for obtaining the probe information of each purified probe;

20 an inspection apparatus for judging "good" or "not good" state of synthesis and purification of each purified probe;

an apparatus for depositing, to the carrier, each probe solution supplied from a storing container individually storing each purified probe solution judged as "good";

25 an analysis apparatus for the carrier subjected to said surface treatment;

an inspection apparatus for judging "good" or

"not good" state, concerning a formed state of the probe deposition area, on the carrier on which the probe deposition area is formed;

an apparatus for executing, on the carrier  
5 having the probe deposition area judged as "good", a fixation of the probe to the surface of the carrier thereby obtaining a probe carrier; and

an apparatus for executing an analytical inspection on the probe in at least one of the plural  
10 probe fixation areas constituted of probes fixed on the carrier.

11. A quality assurance method for a probe carrier, wherein a producing method according to any  
15 one of claims 1 to 8 or a producing system according to claim 9 or 10 is employed to execute an analytical inspection on any one or all of a probe in a probe solution prior to the deposition onto a carrier, a surface treated carrier, a probe deposition area  
20 after the deposition of a probe solution, and a probe fixed to a carrier after the deposition of a probe solution, thereby assuring a quality of a probe chip.

12. A quality assurance method according to  
25 claim 11, wherein the probe chip is a probe carrier produced by a producing method according to any one of claims 1 to 8 or by a producing system according



to claim 9 or 10.

13. A probe carrier produced by a producing  
method according to any one of claims 1 to 8 or by a  
5 producing system according to claim 9 or 10.

14. A probe carrier of which quality is assured  
by a quality assurance method according to claim 11.

10 15. A method for producing a probe carrier  
having plural probes fixed on a surface of a carrier,  
comprising:  
(8-1) a step of executing an analytical inspection on  
a surface of said carrier and judging "good" or "not  
15 good" state of said carrier according to the result  
of said analytical inspection and a predetermined  
criterion;  
(8-2) a step of depositing at least one selected from  
plural probe solutions onto said carrier judged as  
20 "good" so as to form a probe deposition area  
independent for each probe solution;  
(8-3) a step of executing an inspection, concerning a  
formed state of said probe deposition area, on the  
carrier on which said probe deposition area is formed,  
25 and judging "good" or "not good" state of said  
deposition according the result of said inspection  
and a predetermined criterion;

- (8-4) a step of executing, on the carrier having said probe deposition area judged as "good", a fixation of the probe to the surface of the carrier thereby obtaining a probe carrier;
- 5 (8-5) a step of executing an analytical inspection on the probe in at least one of the plural probe fixation areas constituted of probes fixed on said carrier; and
- 10 (8-6) a step of judging "good" or "not good" state of the produced probe carrier according to the result of said analytical inspection and a predetermined criterion.